

**Institute for  
Prospective  
Technological Studies**

# Annual Report 97





European Commission

Edith Cresson

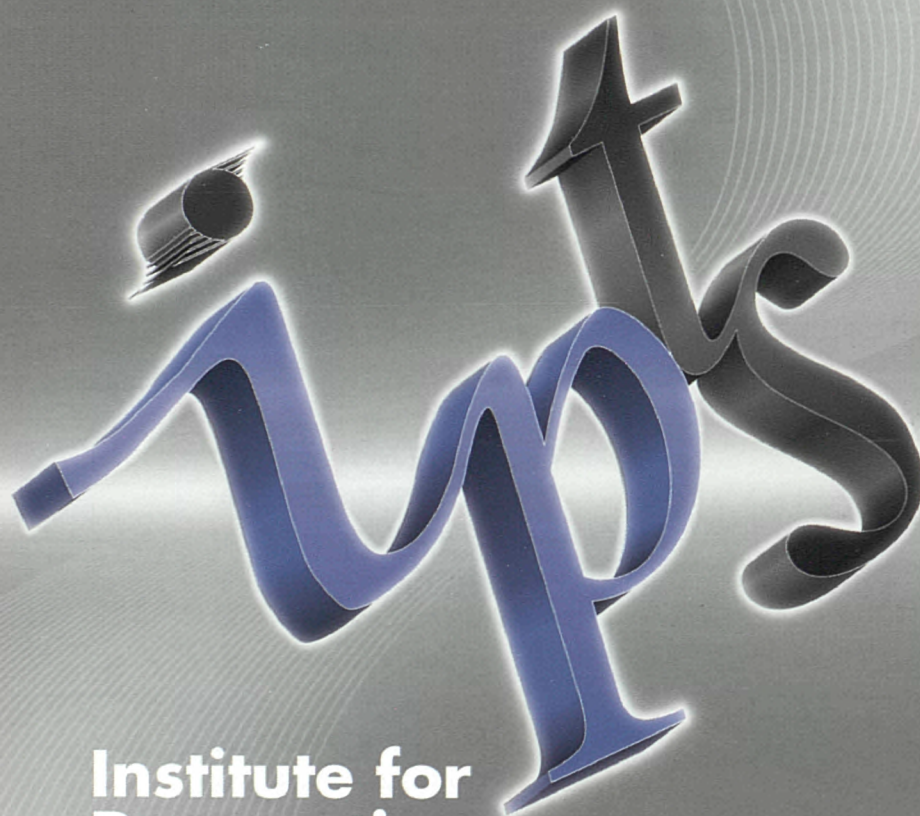
*Member of the Commission  
responsible for research, innovation,  
training and youth*

Directorate-General Joint Research Centre  
Institute for Prospective Technological Studies

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**Institute for  
Prospective  
Technological Studies**

# Annual Report 97



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# Foreword

It is a new challenge for me to have been appointed, as of January 1998, Director of the Institute for Prospective Technological Studies, thus succeeding, after a transitional period, Herbert J Allgeier, who is now the new Director-General of the Joint Research Centre. Many of the current achievements of the IPTS and its recognition are clearly the direct result of his past work and prospective vision.

The IPTS is a recent addition to the Joint Research Centre. It was established in Seville (Spain) in September 1994 in response to President Delors' wish that a centre for prospective technological research be set up within the European Commission. The initial idea was to bridge the gap between S&T (science and technology) and society, based on the observation that technological development plays an increasingly important role in the policy-making process.

Thanks to the effort made during the early years in setting up the infrastructure, expanding capacity, and developing scientific and industrial contacts, the work undertaken in 1997 has been particularly fruitful in terms of the results produced, as I hope will be apparent from the range and scope of projects you will find described in this report.

The main challenge which lies ahead, and which I intend to address, is to make the work of the IPTS more directly relevant to the European decision makers, by better linking the work of the Institute to Europe's political agenda, by adding a new product to those already produced by the Institute, namely Executive Notes, which will address relevant issues in a concise and readable form and by carrying out a major prospective exercise on the European future, evaluating the impact on Technology, Competitiveness and Employment of the phenomenal changes which will occur in Europe in the ten years ahead.

I look forward to being able to report progress along these lines a year from now.

J M Cadiou







# Introduction

Established in Seville, Spain, in 1994, the Institute for Prospective Technological Studies (IPTS), is the youngest of the seven institutes of the European Commission's Joint Research Centre (JRC)<sup>1</sup>. Its mandate, has been defined by Edith Cresson, Commissioner for Research, Innovation, Education, Training and Youth, as follows:

"The task of the IPTS is to collect information about technological developments and their impact in Europe and worldwide, to analyse this impact, and transmit it in distilled form to European decision makers."

In order to fulfil its mandate the IPTS carries out the following broad tasks:

- Ongoing technology watch, observing scientific and technological developments of significance for European policies.
- Direct research on the inter-relationship between technology, competitiveness and employment.
- 'Work on demand' in response primarily to the needs of other Commission services and the European Parliament.

The work of the IPTS is aimed at assisting European policy-makers in the management of change, in particular change driven by, and managed with the help of, science and technology (S&T). Specifically the IPTS provides techno-economic analysis by monitoring and assessing S&T developments (first-level), towards understanding their projected repercussions for the socio-economic context (second level), focusing on those repercussions which are policy-relevant (third level). In carrying out its work, the IPTS enjoys the specific advantage of a cross-sectoral, multi-disciplinary approach.

Prospective studies are carried out by the IPTS in a number of major areas, exploiting synergies and cross-fertilization between them wherever they arise. In 1997 the IPTS' centred its activity on the following fields:

- The Environment
- Energy
- Transport and Mobility
- Information and Communication Technologies
- Life Sciences and Bio-technology
- Integrated Pollution Prevention and Control
- Perspectives for Europe
- Technology, Knowledge and Organizational Change
- Regulatory Frameworks for Emerging Technologies
- Innovation, Diffusion and Growth
- Regional Prospects
- Natural Resource Management.



The primary aim of this work is to provide information to European policy-makers, and its results are disseminated through techno-economic intelligence reports, workshops, briefings and short prospective notes delivered directly to the specific user commissioning the study. In addition to these products, the IPTS edits, publishes and distributes its own widely-circulated monthly journal, The IPTS Report, which focuses on brief analyses of under-explored policy-related S&T issues.

Another important feature of the IPTS is its network of relationships with external organizations. On the output side this means its relationship with users, who are mainly the European Parliament and other European Commission services. On the input side this means its relationship with the S&T community and its sources of knowledge. This latter group includes the European Science and Technology Observatory (ESTO), which gives it ongoing support for technology watch activities, and the High-Level Economists Group, supporting and advising it on economics-related issues.

Looking into the future, the IPTS will continue to strengthen its capability to support European decision-makers dealing with S&T related issues. In particular, it will reinforce its work in those areas which are undergoing rapid development and which have crucial implications for the European Union agenda.



<sup>1</sup>The Joint Research Centre is the Directorate General (DG) of the European Commission whose prime mission is to provide S&T support to the conceptual development, implementation and monitoring of European policies. It consists of an administrative office in Brussels and seven specific research institutes located in five different Member States (Italy, Belgium, the Netherlands, Germany and Spain).





# Highlights of 1997

Below a few examples are given of the many initiatives upon which IPTS focused its energies during the past year:

- The European Science and Technology Observatory (ESTO), the IPTS' main support for technology watch, came into full operation in January 1997. It is a network of 14 S&T organizations spread across the EU Member States. It also draws upon the support of several associated members both in and outside Europe. Coordinated by the IPTS, ESTO provides baseline input to the work of the Institute in the form of reports, articles, and quick-response communications. It also plays a role in disseminating the results of IPTS work throughout the Member States.
- The IPTS' monthly journal, The IPTS Report, is receiving increasing recognition worldwide and demand crossed the threshold of 7000 copies. It can be freely consulted via the Internet (<http://www.iptsreport/>).
- In co-operation with the DG XI (Environment), the IPTS set up the European Integrated Pollution Prevention Control Bureau (EIPPCB), based at the Institute's premises. The task of the Bureau is to produce studies on the best available techniques in several industrial sectors, as outlined in the Integrated Pollution Prevention Directive. These studies are subsequently used as the basis for granting local environmental permits.
- A high-level Economists Group was set up to advise the Institute on the economic dimension of its work programme. The group, which is unique both in its membership and long-term objectives, is led by Nobel laureate, Robert Solow, and comprises economists from both Europe and the USA. It now plays a major role in validating the economics-related content of important IPTS documents.
- A conference was held in October 1997 on "Made in Europe", an initiative exploring the interaction between pervasive technological trends and social and economic spheres. The publication of a special issue of The IPTS Report in June 1997, under the same title, summed up the concept of the project now evolving within the framework of Perspectives for Europe, a new field of work for the Institute<sup>2</sup>.

<sup>2</sup>Based on the work undertaken in "Made in Europe" the IPTS decided, in early 1998, to launch a much broader initiative with a more prospective focus under the title "The Futures Project". This will be reported in next year's Annual Report.



More generally, the IPTS carried out a large number of studies concerning a variety of technical fields, including in particular the environment, energy and transport, giving direct support to the Commission services and the European Parliament. In addition, a number of activities relating to regional development were also undertaken, particularly through the IPTS' participation in the Monitoring Committee for Euro-Mediterranean Cooperation in RTD, the Committee of the Barcelona Process, and support to the activities of the European Commission Directorates General XVI (Regional Policy and Cohesion) and IB (External Relations: Mediterranean, Middle and Near East, Latin America, Asia and North-South Cooperation).



**The IPTS**

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# Support to the European Parliament and the European Commission Services

The IPTS performs much of its work on request from other European Commission services and from European Parliament Committees, and so maintains direct contact with both. The primary objective of this work is to contribute to, and support, the development of European policies with a significant S&T component. As stated in the Council Decision of 1994 on the JRC Specific Programme, "The Institute for Prospective Technological Studies will provide the European Parliament, the Commission [.....] with an information service on progress in science and technology".

In this respect, the IPTS essentially acts as an S&T "think tank" whereby its general policy line is to remain strictly upstream of existing programmes and current negotiations. It focuses on collecting information on S&T events, analysing their relevance for European policies and communicating them in a distilled, intelligible form.

## The ESTO Network

The European Science and Technology Observatory (ESTO) network's mission is to alert the IPTS regarding scientific or technological breakthroughs, trends and events of potential socio-economic importance which may call for action at a European decision-making level. ESTO members therefore have a shared responsibility to supply the IPTS with up-to-date, high-quality scientific and technological information drawn from all over the world, facilitated by the Network's international contacts. This information is then channelled by the IPTS to its main users, who are basically European science and technology policy-makers.

Following a brief pilot phase, ESTO was formally inaugurated by the IPTS in February 1997. It is organized around a Coordination Group (ESTO-CG) which has a contractual obligation to the IPTS and is composed of fourteen European institutions from 11 countries (see table below), all with expertise in the field of scientific and technological assessment at national level.

The "governing body" of the ESTO Network, the Executive Committee (ExCo), includes the coordinator (VDI-TZ) and four members, elected by the ESTO-CG from among its members. It assigns resources to the proposals received from ESTO partners, in response to the IPTS' definition of its tasks, quality criteria, and final deliverables.



**Table of ESTO Coordination Group Members**

ADIT	Agency for Diffusion of Technological Information	France
CEST	Centre for Exploitation of Science and Technology	United Kingdom
COTEC	COTEC Foundation for Technological Innovation	Spain
DTU	University of Denmark, Unit of Technology Assessment	Denmark
ENEA	Directorate Studies & Strategies	Italy
INETI	National Institute of Engineering and Industrial Technology	Portugal
ITAS	Institute for Technology Assessment and Systems Analysis	Germany
NUTEK	Department Science Policy Studies	Sweden
OST	Observatory for Science and Technology	France
SPRU	Science Policy Research Unit	United Kingdom
TNO	Centre for Technology and Policy Studies	Netherlands
VDI-TZ	Future Technologies Division	Germany
VITO	Flemish Institute for Technology Research	Belgium
VTT	Group of Technology Studies	Finland

In order to widen ESTO to include a greater number of competent organizations and ensure openness of the network an association procedure has been set up allowing new members to join.

**Table of ESTO Associate Members**

Seibersdorf	Austrian Research Centre Seibersdorf	Austria
OSTC	Federal Office for Scientific, Technical and Cultural Affairs	Belgium
Technopole	Bruxelles Technopole asbl	Belgium
IPC	Irish Productivity Centre	Ireland
ICTAF	Interdisciplinary Center for Technological Analysis & Forecasting	Israel
CeS&T	Fondazione Rosselli	Italy
ISI	Fraunhofer Institute for Systems and Innovation Research	Germany
ATLANTIS	Research Organization	Greece
INTRASOFT	INTRASOFT S.A.	Greece
META	National Technical University of Athens	Greece
CREACTION	CREACTION INTERNATIONAL S.A.	Luxembourg
MERIT	Maastricht Economic Research Institute on Innovation and Technology	Netherlands
NRLO	National Council for Agricultural Research	Netherlands
CEX	Corporación Empresarial de Extremadura S. A.	Spain
FCR	Fundació Catalana per a la Recerca	Spain
FEND	Federation for Enterprise Knowledge Development	Spain
PREST	Victoria University of Manchester	UK



## ESTO Activities

During 1997, ESTO was engaged in the following technology watch activities:

- Production of articles on science and technology related issues (a total of 23 articles) for The IPTS Report, the IPTS' monthly journal targeted at European policy-makers.
- Contribution to a Baseline Techno-Economic Report. The aim of this report is to provide a synthesis and interpretation of recent changes and developments in society and the economy, which either derive from, or are drivers of, technological change and innovation.
- A series of specific prospective projects, again targeted at European decision-makers, intended to act as a trigger for in-depth studies to identify and analyse trends.
- A permanent technology watch function, achieved by means of a set of thematic Networks enabling the IPTS to provide rapid responses to specific requests from users.

The ESTO Network partners conducted specific projects on various subjects relevant to the function of the IPTS. Twelve projects of varying scope (small, medium and large) were completed in 1997 with the involvement of all ESTO partners (see list below).

### List of ESTO projects

C1/97	Biocatalysis in Europe Participants: TNO, SPRU, VDI, VTT
C2/97	Analysis of selected alternative vehicle technologies Participants: CEST, ENEA, INRETS, VITO, VDI
C3/97	The innovation potential in selected recycling sectors Participants: ADEME, CEST, TNO, VITO,
C4/97	Internet commerce: incidence, methods and implications Participants: CEST, COTEC, ITAS, SPRU, NUTEK, VTT
C5/97	Environmental futures Participants: CEST, OST, NUTEK
C6/97	Scientific and technological challenges in relationship with a European maritime policy Participant: OST
C7/97	The markets for technological knowledge: new forms of knowledge access Participants: OST, SPRU, TNO
C8/97	The strategic position, legitimisation and outlook of public financed technology institutes in Europe Participants: CEST, ENEA, ITAS, OST, TNO



C9/97	Factor 4 technologies: European state of the art Participants: ADEME, CEST, INETI, ITAS, SPRU, VDI
C10/97	Nutritional surveillance in Europe - assets and liabilities Participants: OST, SPRU, VDI
C11/97	Strategic management of sustainable transport innovation Participants: CEST, VDI, VITO
C12/97	Technological solutions to the challenges posed by the introduction of genetically modified organisms (GMOs) Participants: CEST, INRA, SPRU, VDI

## High-Level Economists Group

A group of eminent economists has been brought together to support the IPTS in providing long-term, techno-economic analysis for policy-makers involved in the management of change.

The group is composed of MIT's Nobel Prize-winner, Robert Solow; Princeton University's William Branson (former Director of International Studies at the US National Bureau of Economic Research, and Senior Economist at the Council of Economic Advisers), David Ulph (Chairman of the Economics Department at the University College London), Jean Jacques Laffont (University of Toulouse, European Economist of the Year Laureate in 1995), Christian von Weizsacker (University of Köln, US Academy of Sciences, Chairman of the German Monopolies Commission).

The group's remit is to collaborate with the IPTS over the selection and implementation of projects, and to be involved in the vetting and validating of important documentation produced by the IPTS. The group provides the authoritative support crucial to the success of some of the most visible IPTS products.

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## MAIN ACHIEVEMENTS IN 1997

In the course of 1997 the group has explored the technology-employment interaction in a series of meetings and discussions and provided an important validation function for the IPTS. Projects given the go-ahead are focussing on the following areas:

- deepening our understanding of skills/training and their relationship to employment
- a study of firms regarding employment performance vis-à-vis their attitude towards technology
- a comparative evaluation of labour market forecasts of future skills demand, in conjunction with similar forecasts on technological developments.

## User of IPTS Output

The satisfaction of the users of IPTS information can be measured by the increasing number of requests for support addressed to the Institute. In 1997 an agreement to support the work of the DG III (Industry) was signed with the JRC-IPTS. In addition, support has been provided to other European Commission services including:

- The Forward Studies Unit, DG IB (External Relations: Mediterranean, Middle and Near East, Latin America, Asia and North-South Cooperation)
- DG V (Employment, Industrial Relations and Social Affairs)
- DG VI (Agriculture)
- DG XI (Environment, Nuclear Security and Civil Protection)
- DG XII (Science, Research and Development)
- DG XIII (Telecommunications, Information Market and Research Valorisation)
- DG XVI (Regional Policy and Cohesion)
- DG XVII (Energy).

With regard to the European Parliament, the IPTS has lent support to the work of:

- The Committee on the Environment, Public Health and Consumer Protection
- The Committee on Economic and Monetary Affairs and Industrial Policy

In addition the IPTS has worked on a collaborative project with the Science and Technology Assessment Office (STOA, see below).



**For the FSU (Forward Studies Unit)**

- Conference on European prospective studies
- Micro-economic case studies
- Green accounting
- New Economic Models
- Climate change
- Risk assessment and regulations
- New technologies and the future of work
- Risk assessment and governance
- Information society and governance

**For DG III**

- Framework agreement to support EU industrial policy including projects on industrial innovation systems and technology foresight:
  - benchmarking, diffusion of ICT technologies and organization practices
  - impact of regulation on innovation
- Profile of the water industry in Southern EU countries
- Biotechnology and the greening of industry.

**For DG XI**

- Establishment and operation of a European bureau for Industrial Pollution Prevention and Control
- Study of exotic biological resources

**For DG XVI**

- Towards sustainable management of water resources in the Mediterranean countries

**Common support to various EC services**

- Supervision of a feasibility study for a solar thermal power plant in Morocco (together with the World Bank) (DG IB, DG XII, DG XVII).
- Solar-thermal energy strategy (DG XII, DG XVII, DG IB)
- S&T support to the Euro-Mediterranean Monitoring Committee (DGIB, DG XII)
- Environmental futures (DG XI, CdP)
- New initiatives in ETAN - support to ageing technologies and global climate change (DGXII,DGV,DGXI)
- Technology foresight-watch and socio-economic studies for industrial materials and technologies (DG XII, DG III, DG XIII, JRC)
- Discussion paper on "Competitive and Sustainable Growth: Products, Processes and Organization anticipating FPV" (DGXII.C)
- Input Green Paper on Innovation (Chair of Interservice Group) (DGXIII)
- The Management of Intellectual Property Rights in the Public-Funded Research (JRC, DG XIII)



### For the European Parliament

#### Committee on the Environment, Public Health and Consumer Protection:

- Environment and Employment  
The Legal Definitions of Waste

#### Committee on Economic and Monetary Affairs and Industrial Policy:

- Advanced Technology and the Competitiveness of European Industry: Case studies of textiles, steel, motor vehicles and aerospace

#### Collaboration with the Scientific and Technological Options Assessment (STOA):

- A Prospective Analysis of the Pharmaceutical R/D and Innovation

### Support to the European Parliament

During 1997, IPTS activities supporting the work of the European Parliament concentrated on the production of various Reports for the Committee on the Environment, Public Health and Consumer Protection and the Committee on Economic and Monetary Affairs and Industrial Policy.

In addition, the Institute contributed to the preparation of the following Parliament Committee Hearings within the two Committees mentioned above:

- "Improving European Waste Management"
- "Environment & Employment"
- "The Competitiveness of European Industry"

The IPTS has also worked in collaboration with experts from the Scientific and Technological Assessment Office (STOA) on a Report on "A Prospective Analysis of the European Pharmaceutical R/D & Innovation".

## Information Dissemination

### Reports, Notes and Articles

The prime task of the IPTS is to identify, analyse and communicate relevant S&T related information to the European Union's decision-makers. Disseminating information is thus central to the IPTS' activity. The means used to achieve this objective range from production of annual techno-economic reports, the monthly IPTS Report, to the organization of conferences, seminars and workshops.



The IPTS' publications fall into the following classes:

- Articles in The IPTS Report
- Executive notes (occasional, issue specific, targeted recipients)
- Annual techno-economic reports
- Technical reports, most often in conjunction with an IPTS project or study.

A total of 31 technical reports were produced and published in 1997. Most requests for copies came from the various EU Member States' ministries, research and academic institutions. Apart from the demand from European countries, a great deal of interest in IPTS publications has been shown by organizations in Eastern Europe, Latin America and the USA.

The Institutes' scientific staff are increasingly being requested to contribute to regional, national and international conferences. The IPTS presented papers at a variety of conferences during 1997 and also contributed articles to scientific journals. During 1997, the IPTS organized over 40 conferences, workshops and meetings at its base in Seville, involving a total of 527 participants.

The IPTS also makes information available on its Web page, announcing forthcoming scientific events and special interest reports. Over the past year the Website was visited by more than 22,000 people.

### The IPTS Report

The IPTS Report was launched in December 1995 and since that time has proved a valuable focus for IPTS' energies and skills as well as a vehicle for bringing prospective issues to a wider audience and opening up a broader debate.

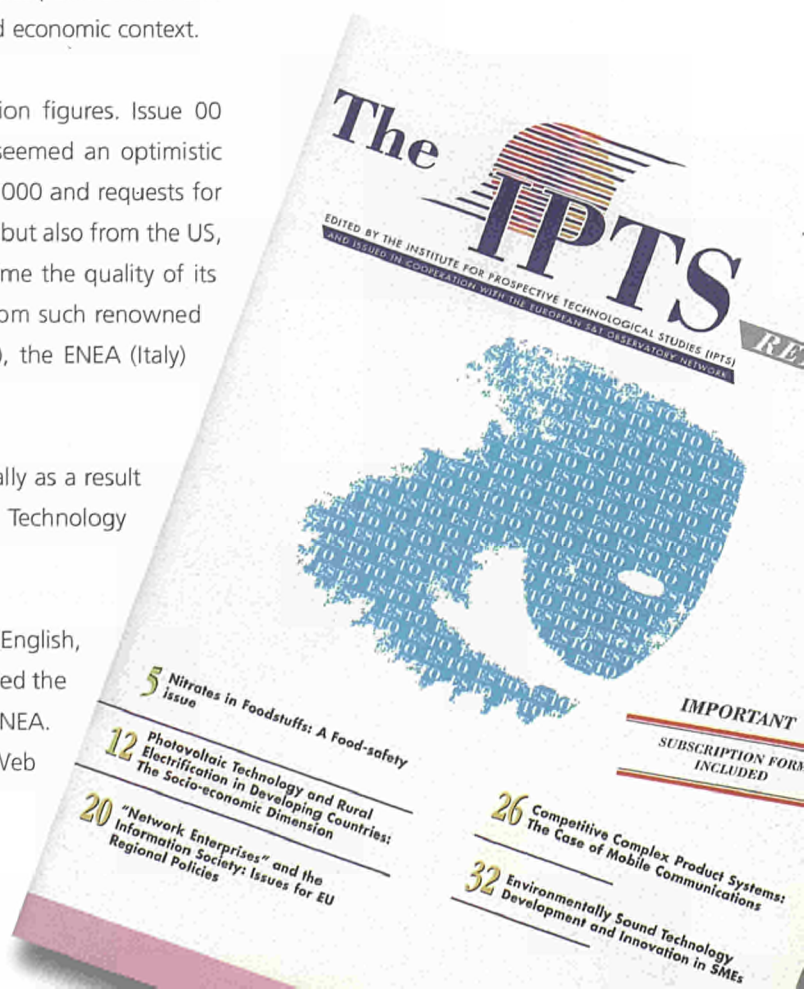
The Report has published articles covering the whole range of the IPTS' fields of interest. It differentiates itself from other technical and scientific journals in that it seeks to select issues which are policy-relevant from a prospective studies point of view and which are at the interface between technology and its social and economic context.

The success of the IPTS Report is evident from the circulation figures. Issue 00 (December 1995) had a print run of 2000 copies, in what seemed an optimistic projection at the time. Since then, its circulation has risen to 7000 and requests for subscriptions have come not only from various parts of Europe but also from the US, Japan, Australia, Latin America, N. Africa, etc. At the same time the quality of its content is being maintained, with contributions by authors from such renowned institutions as the TNO (the Netherlands), the VDI (Germany), the ENEA (Italy) and the US Council of Strategic and International Studies.

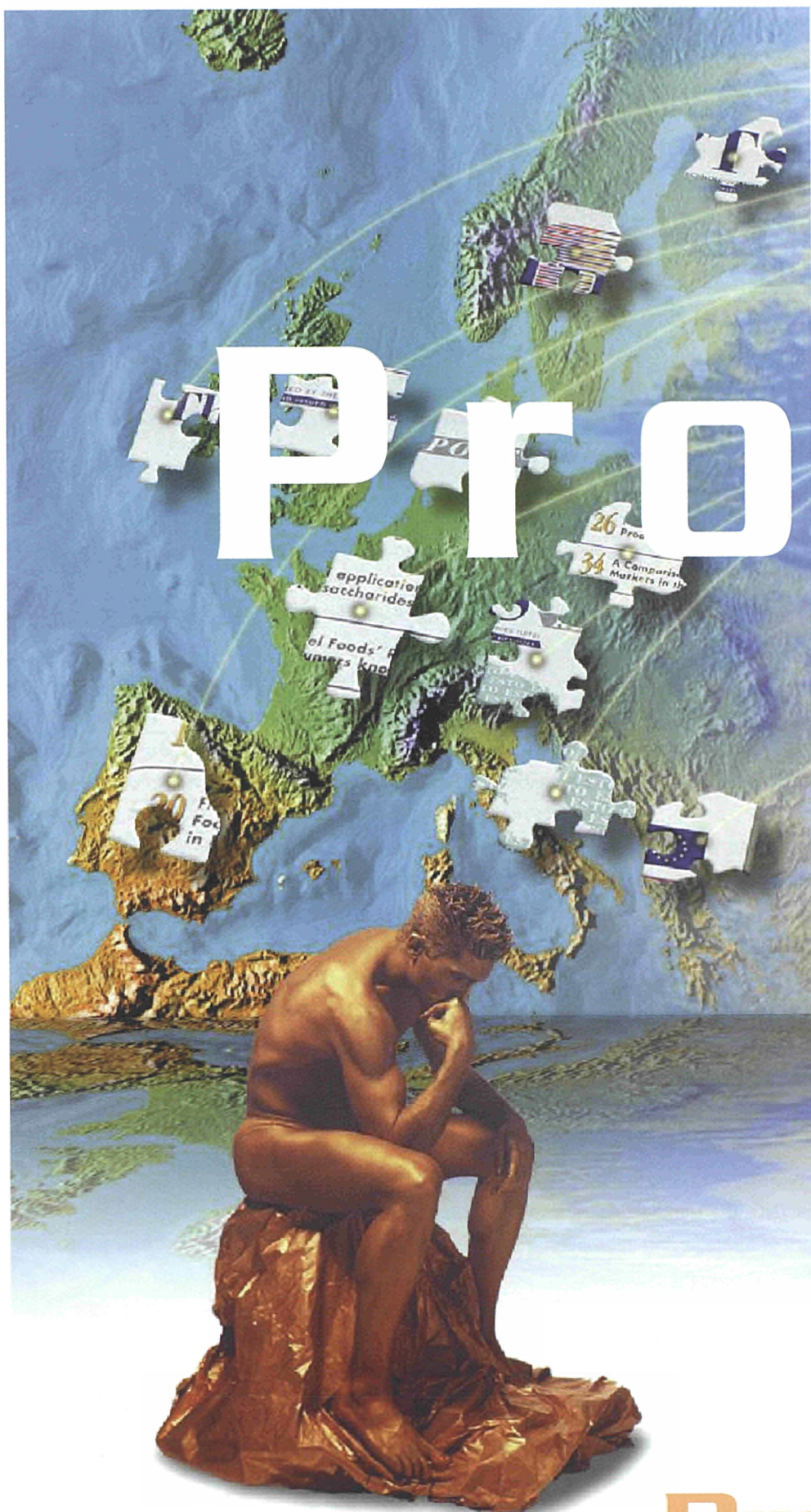
The number of external contributions has increased dramatically as a result of the direct involvement of the European Science and Technology Observatory (ESTO).

The Report is produced simultaneously in four languages (English, French, German and Spanish) by the IPTS to which may be added the independently published Italian translation volunteered by ENEA. Current and past editions can also be seen on-line on the Web (see box).

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Past and current issues can be seen on  
the web at: [www.jrc.es/iptsreport/](http://www.jrc.es/iptsreport/)







Project



## Projects

## Projects

The IPTS, as one of the institutes of the JRC, provides scientific and technical support for the conception, implementation and monitoring of EU policies. It addresses a wide range of S&T issues offering a Europe-wide assessment of the policy-relevant impact of scientific and technological change. IPTS projects examine S&T-related issues from a three-level perspective: science and technology, socio-economic content, and policy relevance.

Prospective studies are carried out by the IPTS in a number of major research areas, exploiting synergies and cross-fertilization between them. In 1997 the IPTS' work involved studies in the following fields:

- Environment
- Energy
- Transport and Mobility
- Information and Communication Technologies
- Life Sciences and Bio-technology
- Integrated Pollution Prevention and Control
- Perspectives for Europe
- Technology, Knowledge and Organizational Change
- Regulatory Frameworks for Emerging Technologies
- Innovation, Diffusion and Growth
- Regional Prospects
- Natural Resource Management

Regional Prospects and Natural Resource Management were both mainly focused on the Mediterranean region.



# Environment

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The main focus of the IPTS' work in the environment sector is on clean technologies and services, an approach set to replace end-of-pipe or remedial technologies as part of the shift towards sustainability. The IPTS' work analyses the socio-economic impacts of these changes and the mechanisms which can bring about the transition as efficiently as possible. IPTS activity in the area is channelled along three lines:

- Clean technologies and their interactions with innovation, competitiveness and employment
- Reducing material flows: the development and uptake of new technologies
- New frameworks for environmental policy-making: a more realistic basis for action

The IPTS is also host to the European IPPC Bureau, which has begun to develop a methodological approach to studying the impact of implementing the Integrated Pollution Prevention and Control (IPPC) directive.

## Clean Technologies: Innovation, Competitiveness and Employment:

Business generally accepts the need to take action on the environment but is often concerned by the costs involved. The IPTS is seeking to improve understanding of the benefits of adopting clean technologies by providing the necessary data and analyses. This is being carried out via three ongoing studies launched in 1997:

- **The effect of regulation on innovation:** This study has three aims: to develop and use a methodological approach for analyses of the impact of regulation on innovation. Secondly, to identify issues that need clarification in order to be able to establish a link between regulation and innovation. Finally, to achieve a better understanding of both synergies and conflicts between regulation and innovation.
- **Best Available Techniques (BATs) and competitiveness.** In support to the IPPC Bureau, the impact of implementing the IPPC directive has been assessed, followed up with case studies in three industries - paper/pulp, cement/lime and iron/steel.
- **The relationship between the environment and employment,** which is being studied on behalf of both the European Parliament and the Commission.





## Reducing Material Flows: The Development and Adoption of New Technologies

The IPTS is involved in a number of projects studying technological responses to environmental problems. One major focus is on the development, diffusion and adoption of clean technologies. The specific aim is to increase our understanding of the relationship between the driving forces (regulation and market pressure) and implementation. This has been carried out within the framework of four studies:

■ **Biocatalysts and process integration.** In this field the IPTS has set up a project on "Modern Biotechnology and the Greening of Industry", for DG III (Industry), in order to look at the uptake of biocatalysts in industry.

■ **Nanotechnology.** This study has looked at both the inter-disciplinary collaboration between nanosciences and technologies in general; bio-nanotechnology; and the potential of nanotechnology for cleaner production.

■ **'Sustainable technologies.'** In this field the IPTS, in conjunction with ESTO, has stepped up its technology watch activities regarding technologies representing radical changes in materials and resource flows (so called 'factor 4' and 'factor 10' technologies<sup>3</sup>).

■ **Recycling, waste and wastewater.** The IPTS has been working on the S&T aspects of a "legal" definition of waste and its impact on waste management in the European Union upon request from the European Parliament. This has involved a comparative analysis of existing legislation, highlighting the anomalies which cause problems in waste management and has also provided support to DG XI about the definition of guidelines for the re-use of wastewater in irrigation.

<sup>3</sup>Factor 4 seeks to obtain the same output from a quarter of current inputs. More ambitious still, factor 10 seeks to reduce input ten-fold.

# New frameworks for Environmental Policy-Making: a more Realistic Basis for Action

The IPTS has been involved in identifying a number of innovative approaches to planning and implementing environmental and socio-economic solutions towards sustainable development. Studies in this field have included:

■ **The need for new frameworks for environmental policy making.** The IPTS commissioned an ESTO study and organized a series of workshops to identify future environmental priorities, targets, and instruments.

■ **'Green Accounting': Tools for Assessing Progress.** The IPTS is working as part of a team of five European research institutes and in 1997 work focused on three separate systems of data collection and analysis.

■ **Environmental security: socio-economic evaluation of environmental events of potential global impact.** Launched in response to the Indonesian forest fire this project looks at the possibly disastrous impact of specific events.

■ **A consensus-finding workshop on action on global climate change,** involving a selected group of experts was conducted in November 1997 in collaboration with the European Technology Assessment Network (ETAN).

## MAIN ACHIEVEMENTS IN 1997

This year's main achievements included production of the following reports and publications:

■ *"The legal definition of waste and its impact on waste management in Europe".*  
L Bontoux and F Leone. November 1997, (EUR17716 EN/FR)

■ *"Environment and Employment".* T Gameson, G di Pietro, K Ducatel, F Leone and P Sørup.  
April 1997, (EUR 17350 EN)

■ *"Modern Biotechnology and the Greening of Industry".* C Tils. March 1997, WP 97/03

Opening lecture of 26<sup>th</sup> European Congress of Toxicology (Diversification in Toxicology:  
■ *Man and the Environment*, June 25-29, 1997), P Sørup, pub. *Pharmacology and Toxicology* 80, suppl. III.

Paper at OECD Workshop on Biotechnology for Clean Industrial Products and Processes,  
■ C Tils, Potsdam, FRG, September 1997.

For more information see:  
<http://www.jrc.es/environment/ENVIRONMENT.html>





# Energy

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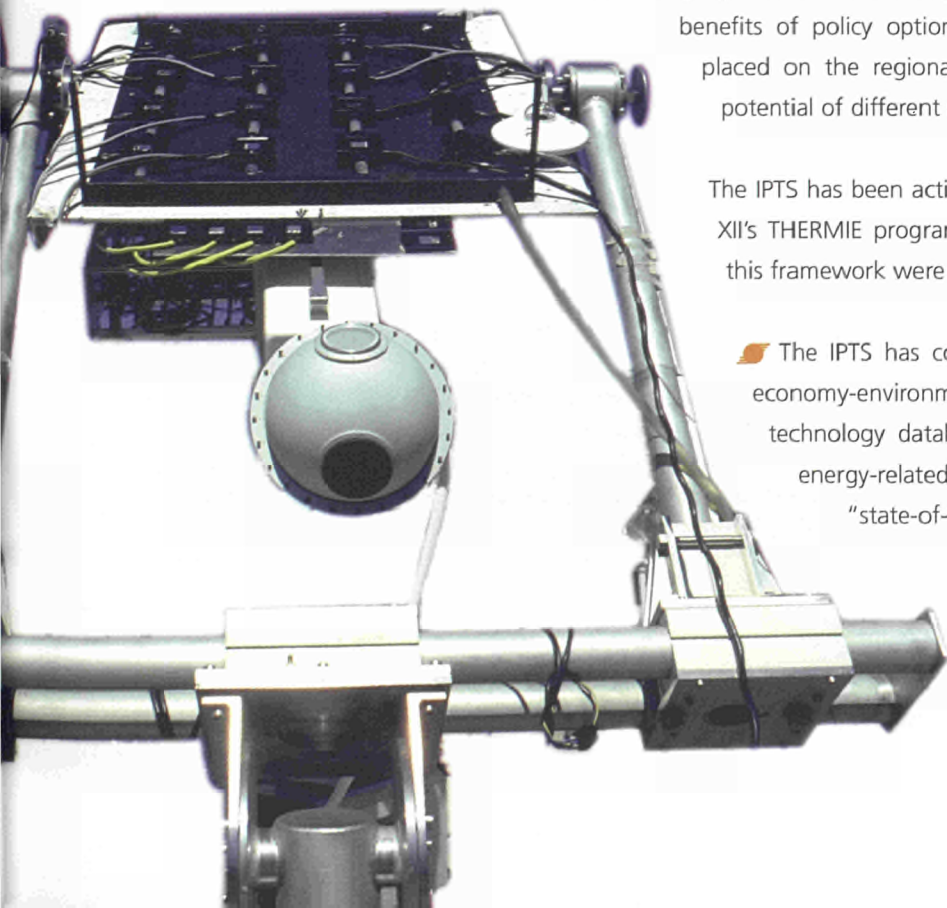
Energy and related services constitute one of the biggest markets within the global economy. An efficient energy supply system is clearly a prerequisite for economic prosperity, but it must also be balanced against environmental and other concerns. The main IPTS activities in this field include technology assessment work, global warming and other carbon-related issues, together with the study of technology diffusion and implementation mechanisms (notably for renewables).

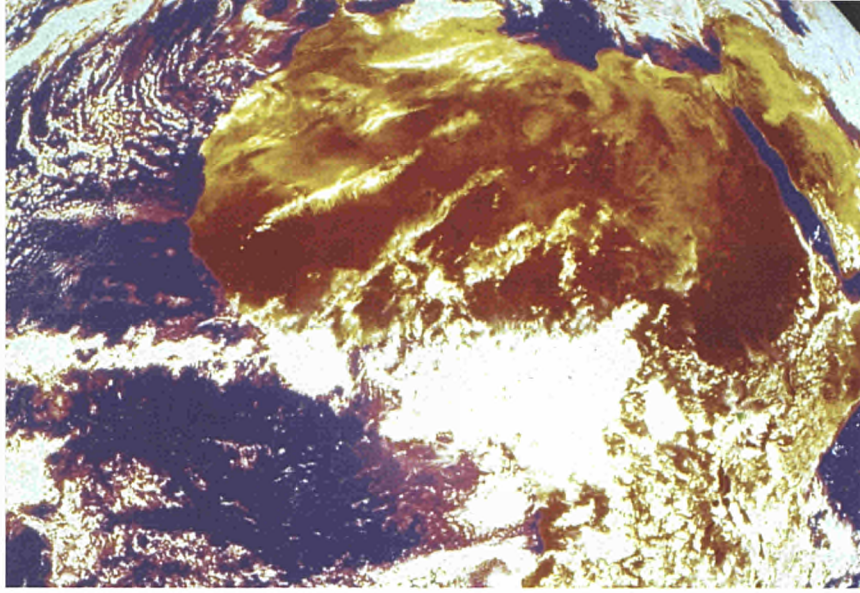
As an overall goal in this field, the IPTS is contributing to the creation of a common knowledge-base addressing the problems of coping with the threat of global warming. The specific objectives are to improve understanding of technology and its potential, and motivate the main players, i.e. operators and industry. This leads to direct input on the environment and energy, legislation, R&D strategies, as well as regional policy including, more specifically, Mediterranean policy. Thus, all projects carried out are designed to fulfil these aims.

The validity of options is scrutinized by illustrating and analysing a number of key technologies, as well as their socio-economic implications, markets and benefits. It is through the study of individual technologies that the relationship between energy, environment and the economy can be analysed. Only after having understood this relationship by means of a thorough study of the market forces, can the potential benefits of policy options be explored. Particular emphasis has been placed on the regional dimension and the employment generation potential of different options.

The IPTS has been actively participating in several consortia under DG XII's THERMIE programmes. The actions undertaken during 1997 in this framework were directed along three main lines:

- The IPTS has contributed to the development of the energy-economy-environment models by defining a unique and detailed technology database, including a complete characterisation of energy-related technologies. This contains, not only present "state-of-the-art" models, but also some possible (and plausible) trends which could characterize energy-related technologies of the future.





- The IPTS has contributed to the analysis of the socio-economic impact of specific renewable energy projects within the Southern Mediterranean countries. This included information from economic cost/benefit analyses and statistical surveys on the impact of the projects on welfare.
- The IPTS has taken part in the dissemination of the results of research, backed by the Commission, on the estimation of the external costs of energy taking a large number of fuel cycles into consideration.

## MAIN ACHIEVEMENTS IN 1997

### Publications

- "Climate Change Research and Policy Updates". no.10, Part II. A Zwick. December 1997 (EUR 17725 EN)
- "The Socio-Economic Impact of Renewable Energy Projects in Southern Mediterranean Countries: Methodology" A Aguado and J C Císcar. April 1997 (EUR 17668 EN)

### Other studies

- Several activities on Global Climate Change in response to requests from the European Commission Forward Studies Unit. These included monitoring research results; analysing policy options in preparation for the Kyoto summit; and a detailed study on the consequences for health from climatic change.
- An analysis of market penetration mechanisms of emerging energy technologies, including characterization of learning curves. A "position" paper on the prospects of solar thermal power plants was issued and a feasibility study for the biomass CIEMAT-owned research centre (Spain) is in preparation.

For more information see:  
<http://www.jrc.es/energy/ENERGY.html>





# Transport and Mobility

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Transport is indispensable in order to satisfy mobility and accessibility needs. Moreover, it plays an important role in the generation of employment and wealth. However, its benefits are often counteracted by side effects such as congestion, pollution, resource depletion and safety, which are of particular concern in urban areas. The complexity of the issues involved requires an integrated and inter-disciplinary perspective, taking into account technological innovation together with organizational change and a deeper understanding of individual mobility behaviour.

The IPTS is supporting the development of sustainable transport policies along two main lines:

- Forward-looking analysis and assessment of transport technologies and practices which are expected to have a major socio-economic and environmental impact, such as alternative propulsion systems, technological breakthroughs in fuels, materials, and telematics.
- Prospective studies on evolving mobility needs, factors influencing individual behaviour, and their implications for the introduction of sustainable transport and mobility systems.

## Prospective analysis and assessment of transport technologies and practices

The first area of work builds on expertise in a broad range of disciplines, with special emphasis on the relationship between transport systems and the environment. Emphasis has been placed on developing and applying methodologies yielding results useful to policy-makers and on disseminating results for European actors in this field.

As part of a study for DG VII (Transport), the IPTS carried out a comprehensive analysis of European, transport-related policy issues, and contributed to technology watch and forecasting work in the field. It has also compiled an on-line policy and technology database dealing with the relationship between industrial logistic chains and the demand for road freight transport. This information has been applied to exploring future opportunities for different types of vehicles (e.g. hybrid, electric, hydrogen, natural gas), within a number of scenarios.

## Socio-technical innovations for urban mobility

The second area of work focuses on the processes whereby new, more sustainable transport systems may be introduced and on the related policy strategies. This work takes into account the broader context of future urban developments, as well as innovative strategies within industry.

In collaboration with seven European partners a project into 'Strategic Niche Management of mobility innovations', is underway for DG XII (Science, Research and Development). A network of practitioners and users has been set up and the results of actual case studies, undertaken in several European countries, have been produced. The IPTS contribution, in association with the ESTO-Network, focused on the opportunities for applying the concept of strategic niche management prospectively to the field of transport innovation.

### MAIN ACHIEVEMENTS IN 1997

- A special issue of The IPTS Report devoted to "Urban Mobility" appeared in February 1997 (edited by J Naegele and M Weber). The aim was to explore the options for the future of innovative development, both in the provision of new technologies and the implementation of new strategies for mobility in cities.
- Research report on "Socio-economic aspects of individual mobility", M Hunecke and D Sibum, September 1997 (EUR 17712).
- Several research reports for DG VII, dealing with policy requirements and with technology watch and forecasting in the field of transport.

For more information see:  
[http://www.jrc.es/mobility\\_transport/TRANSPORT.html](http://www.jrc.es/mobility_transport/TRANSPORT.html)







# Information and Communication Technologies

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The IPTS has included the field of information and communication technologies (ICT) in its programme as a response to the profound socio-economic impact of accelerating technological change in this field. It is essential for the IPTS to be able to react swiftly to new technological developments, and bring the issues requiring action to the attention of EU policy-makers. A selective approach has been followed, taking into account the direct and indirect effects these changes have on competition, productivity, employment, education and society in general.

The following areas have been identified and are being studied in conjunction with the European Commission's Forward Studies Unit:

- Electronic commerce and electronic cash: Markets, Measures and Governance
- Information and Communication Technologies and Governance
- The Impact of Electronic Money: A challenge for the European Union

## Electronic-commerce and Electronic-cash: Markets, Measures and Governance

Recent innovative developments have highlighted both the potential benefits of using electronic cash and the associated potential risks. With the advent of electronic cash the Internet is likely to become an important market. The anticipated changes in this form of financial transaction will have consequences in the areas of taxation, international and domestic banking and monetary policy in general.



# Information, Communication Technologies and Governance

This project has studied the broader context of the changes in governance, initiated by the progress of the information society. More specifically, it has identified alternative models of governance for the emerging Information Age, which will bring about changes in the patterns of work and leisure, entertainment, consumption, education, family and community structures, as well as political activities.

## The impact of Electronic Money: a Challenge to the European Union

This project has analysed the implications of the digitalization of electronic payments, including new forms of traditional currency transactions (such as smart cards, encrypted Internet payments). Cybermoney is already considered to be one of the fastest growing financial instruments in the world and the increased use of the Internet will further broaden the impact of the latest monetary innovations.

### MAIN ACHIEVEMENTS IN 1997

The studies carried out in this area have led to the following reports:

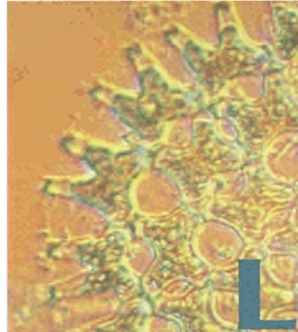
*"The Social Impact of Electronic Money: A Challenge to the European Union?", B Lietaer*

— *"Electronic Commerce: Markets, Measures and Governance", Dr. P Tang (editor)*

— *"Collective Learning Online. A report on the Information Society and Governance Project", M Luyckx and A Frotschnig*

For more information see:  
<http://www.jrc.es/info-tech/IT.html>





# Life Sciences and Biotechnology

Life sciences and biotechnology are two of the fastest developing areas of S&T, and among the richest in potential and in challenges. In 1997, the IPTS focused life science activities along two main lines: agriculture and food, and health.

## Agriculture and Food

The application of biotechnology to agriculture and food is a sensitive topic for the European public. At the same time, activity is booming and the first genetically modified organisms are reaching the marketplace.

The IPTS carried out a "Survey of Plant Biotechnology Research in the European Union" which helped identify 'who does what' in this field and to develop an electronic database of plant biotechnology research in Europe. The work provides a snapshot of the research at the end of 1997 and forms the basis for identifying trends in the future.

The IPTS has also participated in the production of "TERRA" a journal on emerging agricultural biotechnology issues, and in establishing a database under the framework of "AGNET", a network set up under the EC INCO-Copernicus programme to increase co-operation between the EU and Eastern European countries.

In view of the many new developments at European level in terms of food safety, food policy, novel foods and functional foods, the IPTS has mobilized the ESTO Network in the area of food and nutrition. One of the first contributions has been the production of a special issue of The IPTS Report on food in collaboration with ESTO.





## Health

Human genome analysis, genetic screening and gene therapy are developing rapidly, to the extent that it is reasonable to suppose that the genes underlying many diseases will have been identified by the end of the decade. The IPTS has been monitoring new developments in this field to assess their potential.

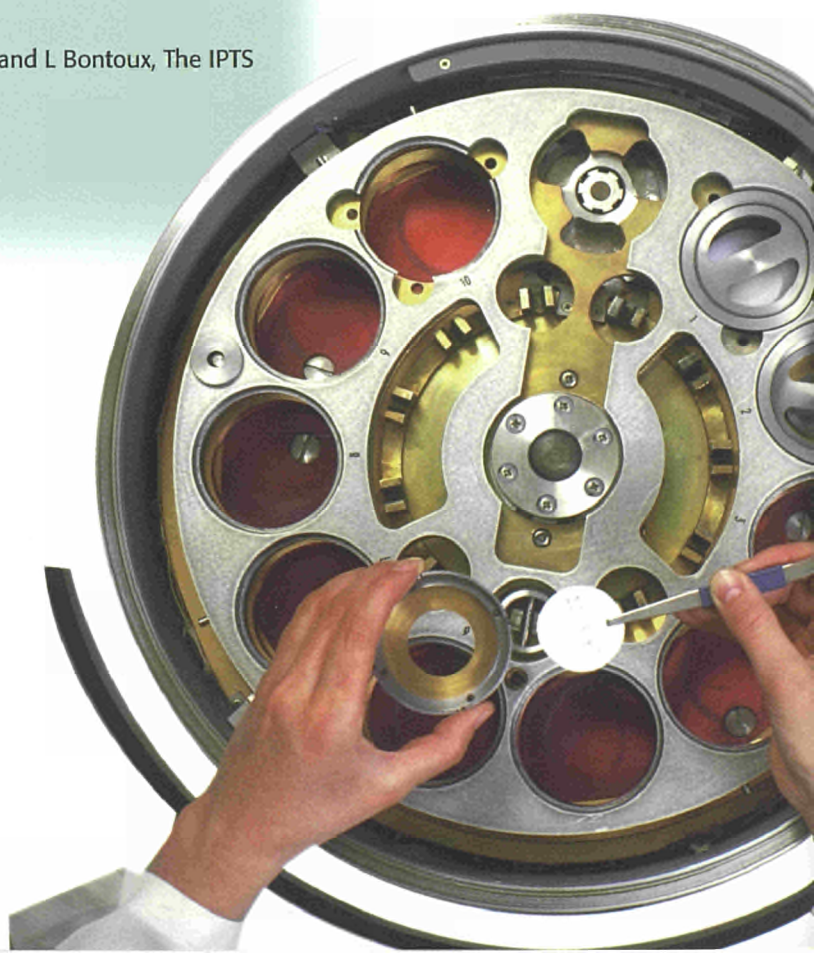
Progress in biotechnology and other techniques in pharmaceutical research will change the need for processing extracts from living organisms, in particular exotic plants, the conventional source for drug development. One IPTS project is investigating to what extent the European industry will depend on such living organisms (pharmaceutical bioprospecting) in the future. While the market leaders are in Europe and America, developing countries are the main repositories of biodiversity, thus making the economic equity and development issues relating to bioprospecting important.

### MAIN ACHIEVEMENTS IN 1997

- Study entitled *"A prospective analysis of European pharmaceutical research, development and innovation"* in conjunction with the London School of Economics, involving in-depth discussions with representatives from both industry and policy units, at national and European level. *"A prospective analysis of European pharmaceutical research development & innovation"*, G Mezelas, March 1997, (EUR 17752 EN).
- *"Survey of Plant Biotechnology Research in the European Union"*, carried out for DG XII E1 (R&D-Biotechnology).
- *"Nitrates in foodstuff. A food-safety issue"*. M Vega and L Bontoux, The IPTS Report n°19, pp 5-11, November 1997.
- *The IPTS Report issue 20 (Special Issue on Food)*, edited by L Bontoux, December 1997.

For more information see:

[http://www.jrc.es/life\\_sciences/LIFE.html](http://www.jrc.es/life_sciences/LIFE.html)







# European Integrated Pollution Prevention and Control Bureau

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In September 1996, the Council adopted Directive 96/61/EC concerning Integrated Pollution Prevention and Control (IPPC). The purpose of this Directive is to achieve a high level of environmental protection at specified industrial installations in an efficient and integrated way.

Article 16.2 of the Directive charges the European Commission with the organization of an exchange of information on "best available techniques" (BAT); associated monitoring; the development of BATs; and to publish the results of these exchanges of information. To these ends, DG XI (Environment, Nuclear Safety and Civil Protection) established an Information Exchange Forum (IEF) and set up individual Technical Working Groups (TWGs) to address the different categories of industrial activities referred to in Annex I of the Directive.

In early 1997, the European IPPC Bureau was set-up within the IPTS in order to organize the work of the various TWGs and begin preparing the 'reference documents'. Each industry sector is addressed by a separate TWG and over a total period of about 5 years, some 35 TWGs will be convened, each working for a 1-2 year period to produce the relevant technical reference document.

The IPPC directive lays down a framework within which Member States must issue operating permits for certain

industrial activities. These permits, which must include conditions based on 'best available techniques', will be obligatory for new and substantially changed installations as of 1999, and must be applied to all existing installations in 2007. Thus, once published by the Commission, the reference documents produced by the IPPC Bureau will provide a unique common basis of technical knowledge for Member States to determine appropriate conditions for IPPC permits.

The year saw work commence successfully with four Technical Working Groups, namely: pulp and paper; iron and steel; cement and lime; and one horizontal sector, cooling and vacuum systems.

The meetings were attended by experts from Member State authorities, the European Commission and non-governmental organizations. They provided a constructive forum, on which to develop a consensus and were successful in identifying the major environmental issues for the particular industrial activities covered. There was a degree of consensus on an initial inventory of appropriate techniques to be addressed on these issues as well as on the most relevant literature. Some contributors had already produced dedicated material for the purpose of the IPPC BAT information exchange, or were in the process of finalizing it.

## MAIN ACHIEVEMENTS IN 1997

- In early 1997, the European IPPC Bureau was set-up within the IPTS to organize the work of the various TWGs and prepare the 'reference documents'.
- Towards the end of 1997, the first documents, aimed directly at the three industry-specific reference documents, were subsequently drafted and circulated to the respective TWGs for comment. The task of detailed descriptions and interpretation, which arose from the work, have been taken up with DG XI and the Information Exchange Forum.

For more information see: <http://eippcb.jrc.es>



# Perspectives for Europe

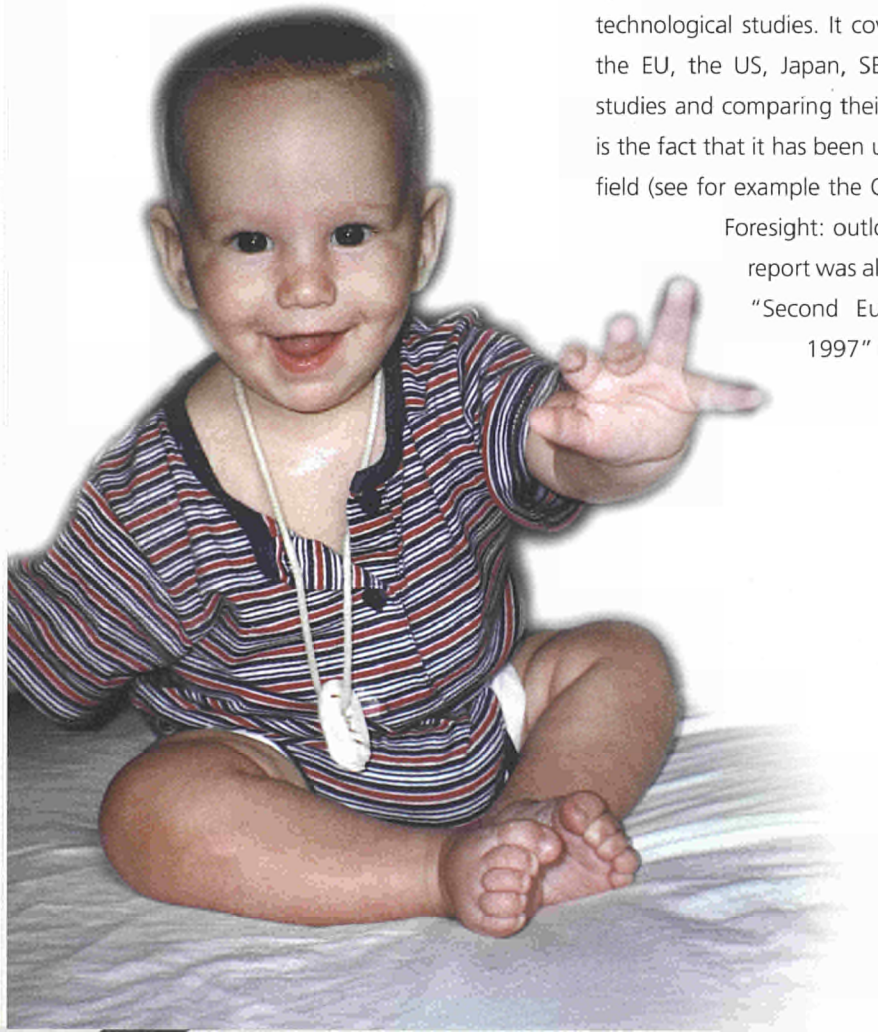
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'Perspectives for Europe' concentrates on the conceptual and methodological issues concerning prospective studies such as the "Futures" and "Made in Europe" projects. It therefore comprises an ongoing series of mini-projects, from which the following two stand out in 1997: an overview of national technology foresight studies inside and outside Europe and a conference held jointly with the Forward Studies Unit.

## Overview / Inventory of National Technology Foresight Studies in and outside Europe.

This is one of the few recent attempts made to compare efforts by different countries and regions in the field of prospective technological studies. It covers the main exercises developed in the EU, the US, Japan, SE Asia and Australia, describing the studies and comparing their results. Testimony to its uniqueness is the fact that it has been used frequently by later studies in this field (see for example the OECD, STI Outlook 1998: Technology

Foresight: outlook and predictions, Nov 1997). This report was also one of the Dossiers included in the "Second European Report on S&T Indicators 1997" (EUR 17639).





## Joint IPTS Forward Studies Unit Conference

In December 1997 the IPTS and the Forward Studies Unit held a joint conference entitled *Prospective Studies for Europe - Anticipating and Shaping Tomorrow's World*. The main aim of the conference was to examine the potential and actual contribution of prospective studies ("foresight, futures futurology, etc.) to strategic planning and the policy-making process, to bring out the methods used and to identify the critical issues for studies looking towards the next twenty years.

The formula adopted for the conference was to invite a mix of prospective studies practitioners and users, comprising prominent personalities and figures from business, politics, and government, to present key-note speeches expressing their views on a number of broad topical themes. Subjects covered included areas such as Institutional Change, Sustainable Development, Wealth Generation, The Future of Work, The Next Millennium.

### MAIN ACHIEVEMENTS IN 1997

- Joint organization with the Forward Studies Unit of a conference entitled *"Prospective Studies for Europe: Anticipating and Shaping Tomorrows World"* and publication of the conference report, M Rogers, Dec 1997
- Publication of report entitled *'Overview of recent European and non-European National Technology Foresight Studies'*, J Gavigan, E Cahill, February 1997, (EUR 17301 EN).
- Production of *"Dossier Overview National Technology Foresight Studies"* in *"Second European Report on Science and Technology Indicators"*, December 1997, (EUR 17639).

For more information see:

<http://www.jrc.es/perspectives/TEC01.html>





# Made in Europe

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The inspiration for the Made in Europe project, which was launched late 1996 and culminated in a major conference in Autumn 1997, was the challenge Europe faces to its well established traditions of social equality and its relatively high standards of living, under pressure from increasingly high-quality competitors operating from much lower cost environments. Already, many European firms are 'delocalizing', with direct impacts on the livelihoods of many European workers, especially those with traditional skills in slow growing, long established industries.

The Made in Europe project set out to give an overview of the issues which could provide some insight into strengthening the competitiveness of Europe.

- The determinants of competitiveness at firm level, inter-firm level and along the value chain, especially regarding the shift towards forms of competition which are not just based on achieving the lowest price.

- Perceptions, expectations and roles of public services in the future, especially concerning the role public services play as enabling factors in social and economic life (through taxation systems, education, social welfare and health-care).

- The sectors where innovation and new business formation will create employment, especially with regard to the increasing knowledge intensity of economic growth and the role of regulatory frameworks on new firm start-ups and growth.

The Made in Europe project was developed in collaboration with three highly reputed Research Institutes: CREI, University of Paris XIII (Prof. B Coriat), La Sapienza University, Rome (Prof. G Dosi), and MERIT, Limburg University (Prof. L Soete), and also had contributions from other European and US Institutes.

## MAIN ACHIEVEMENTS IN 1997

A number of publications have been produced, including the following:

- IPTS Report Special Issue *"Made in Europe"* no. 15, June 1997, Contributors: R M Solow, B Coriat, G Dosi, L Soete, K Ducatel, G Fahrenkrog, J Gavigan
- Working Paper Series (SPI 97102) *"Made in Europe"* Contributors: B Coriat, R K Lester, P Petit, S Haddrill, O Weinstein, F Malerba, D Soskice, G Esping Andersen, L Cartelier, K Ducatel, B, Verspagen, K Morgan and E Reyneri.





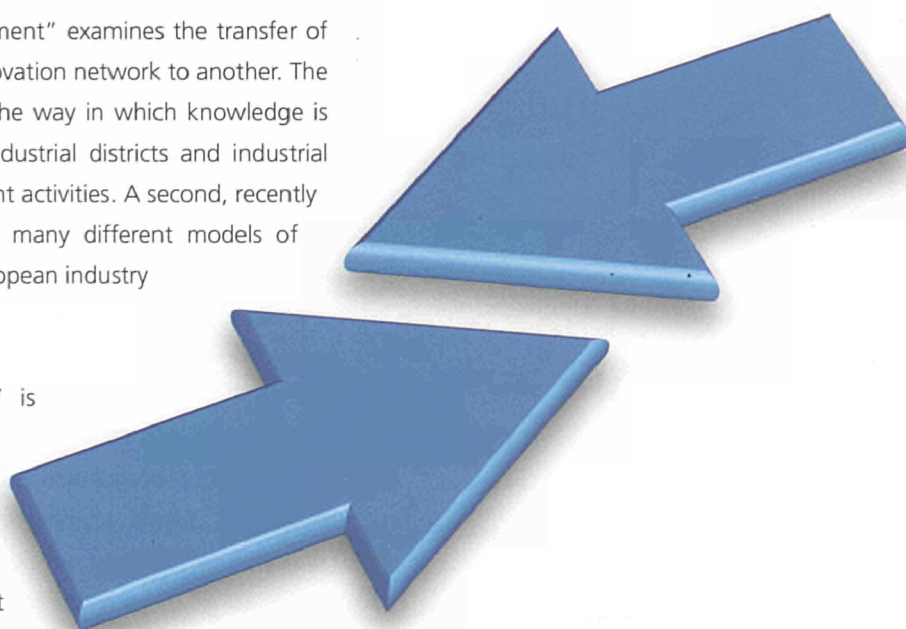
# Technology, Knowledge and Organizational Change

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The management and control of knowledge has emerged as one of the dominant themes of policy research in recent years. The IPTS' work in this field covers both the internal organization of knowledge flows and the growing trade or markets for technical knowledge.

The organizational aspect of "knowledge management" examines the transfer of knowledge from one part of an organization or innovation network to another. The IPTS has a project under development to look at the way in which knowledge is relayed down the value chains of firms within industrial districts and industrial clusters, especially where there are joint development activities. A second, recently completed study catalogues and investigates the many different models of successful innovation, which can be observed in European industry today.

The issue of growing 'markets for knowledge' is covered by two studies. One directly examines the policies on the supply of technical knowledge for industry by the public innovation system (Universities, Innovation Centres and Government Labs). The other looks at the employment implications of Information and Communication Technology led by growth in services such as transport, tourism, retailing and security, which are not normally seen as knowledge-based.



## MAIN ACHIEVEMENTS IN 1997

- *"Markets for Technological Knowledge"* study conducted through the ESTO (European Science and Technology Observatory) Network. The report will be published in 1998.
- Study launched examining the effects of new technologies on patterns of employment and work, in a number of service industries not normally considered to be technology intensive (e.g. hotel and catering).
- Publication of *"Advanced technology and the competitiveness of European Industry: the cases of textiles, steel, motor vehicles and aerospace"*, E Cahill and K Ducatel, December 1997, (EUR17732EN).

For more information see:  
<http://www.jrc.es/tech-know/TEC02.html>

# Regulatory Frameworks for Emerging Technologies

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The IPTS' central focus in this recently-created work area is on the political and regulatory boundary conditions affecting the emergence of new technologies. Beyond specific targeted policies, regulatory frameworks define the space in which new technologies are developed and absorbed by society. In this broader perspective, the notion of regulatory frameworks also takes in the principles, modes and processes of regulation, i.e. the organizational dimension of regulatory policy.

The IPTS' work in this area deals, above all, with the political and regulatory context and the conditions which govern innovation and diffusion processes in specific industries. Attention has been focused on the impact of specific regulations on the technological pathways followed by innovating organizations along with the incentives for them to do so. Areas being studied include the liberalization of the electricity supply industry and the impact of environmental and single market regulation on innovation.

Additionally, the IPTS has started work on a number of horizontal/cross-cutting issues relating to regulation, i.e. the evolution of widely shared beliefs on how public authorities should shape technological development, and, the organizational principles of these policy-making processes for defining regulatory frameworks. The liberalization and privatization of formerly state-owned industries have dominated political debates over the past few years, and have been fuelled by new conceptual and theoretical insights into the inter-dependent relationships between the state, society and technology.

## MAIN ACHIEVEMENTS IN 1997

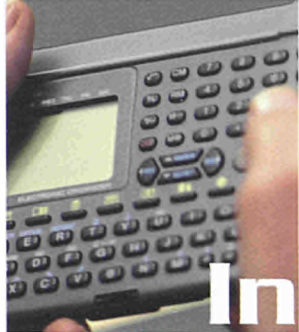
A number of publications have been produced, including the following:

— *"Innovation diffusion and political control of energy technologies. A comparison of combined heat and power generation in the UK and Germany"*, PhD thesis, M Weber, November 1997

— *"National styles of niche development: A comparison of experiences in the fields of energy and transport"*, M Weber & R Hoogma, Conference Paper, September 1997

For more information see:  
<http://www.jrc.es/emerging-tech/TEC03.html>





# Innovation, Diffusion and Growth

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The IPTS has looked at the factors determining technology innovation, efficient technology diffusion and transfer, and economic growth linked to technological change.

Work in this area has been directed at three broad areas:

- Technology transfer from public research institutions.
- S&T, technology diffusion and the competitiveness of industry.
- The relationship of innovation to economic growth.

## Technology Transfer of Public Research Institutions

Studies on Technology Transfer by Public Research Institutions looked at the following cases:

- Methods for identifying marketable technologies that may have an innovative impact on European businesses at an early stage in their development.
- Monitoring and analysing new mechanisms for the improvement of technology transfer from public research institutions to industry.
- Management of intellectual property rights.

This also includes support for the JRC's European Technology Transfer Initiative.



## Technology Diffusion and the Competitiveness of Industry

The second research area, Technology Diffusion and the Competitiveness of Industry, had the following goals:

- Examining the competitive position of a selected number of industrial sectors, together with an analysis of the European industry's situation regarding Intelligent Manufacturing Systems.
- Benchmarking the diffusion of Information and Communication Technologies, new organizational arrangements, and identification of performance indicators.
- Improving our understanding of the obstacles to co-operation between SMEs in Research and Development.

## Science, Technology and Innovation for Economic Growth

The third area, Science, Technology and Innovation for Economic Growth, had the following goals:

- Analysis of the impact of S&T and innovation instruments on EU less favoured regions.
- Improved understanding of the dynamics of economic growth and technological progress.

### MAIN ACHIEVEMENTS IN 1997

A number of reports were produced in 1997, including:

- *"Technological know-how processes, convergence and growth in the European less favoured regions"*, J Rojo, for The International Conference on Technology Policy and Less Developed Research and Development Systems in Europe, United Nations University/Intech. Seville, Spain, 17-18 October 1997 (ORA/PRO 41053).
- *"The Analysis of Patents for Technology Watch"*, J. Rojo, seminar "Generación y Protección de Nuevas Tecnologías: Patentes e Intermediación" sponsored by The Spanish Patent and Trademarks Office and The Madrid Chamber of Commerce and Industry, Spain, December 1997 (ORA/PRO 41133).
- *"The Management of IPR In the Public-Funded Research Organisations: 6 Case-studies of Self Management"* Author: E Cahill; Editor: P Moncada Paternò Castello - May, 1997.
- *"Identification of a cluster of technologies owned by the Community which may have an innovative impact in the European enterprises"* - Authors: P Moncada Paternò Castello, J Rojo, G Slavazza, T Amorelli, A Manandez and F Bellido - Final report (for the EC/DG XIII/D) - January 1998.

For more information see:  
<http://www.jrc.es/growth/TEC04.html>



# Regional Prospects

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A number of projects dealing jointly with geographic and socio-economic dimensions have been undertaken under this heading, concentrating in particular on the "local elements" of development.

IPTS projects in this field in 1997 paid particular attention to the prospects of Meso-Regions (e.g. the Mediterranean, central Europe). The overall objective was to advise and support policy-makers and actors concerned with regional questions, in particular:

- To encourage the sharing of knowledge and expertise among different regions.
- To bring together existing knowledge on regional socio-economic systems at the level of sectors (e.g. agrofood) and individual S&T systems.
- To analyse existing industrial organizational trends, e.g.

micro-enterprises, industrial districts, delocalization.

Variables such as geography, socio-economy, environment and local policies were included in the analyses and special attention was paid to the local production system, trade practices, and to the prospective impact of S&T.

Two major lines of action have been defined:

- The Euro-Mediterranean Partnership,
- Regional Development

The IPTS' role in the Euro-Mediterranean Partnership is to provide S&T background information to support the Monitoring Committee for Euro-Mediterranean Cooperation in RTD, which was established in the framework of the Barcelona Conference in 1995.

## MAIN ACHIEVEMENTS IN 1997

- *"The EU and the Mediterranean Region: a Future Dilemma?",* Medit, Centre International des Hautes Etudes Agronomiques Méditerranéennes, M Bonazzi and S Gomez y Paloma, pp. 10-15, 1997 (*The IPTS Report*, n° 14, May 1997)
- *"Research Policy and Technological Development in the Southern and Eastern Mediterranean Countries",* P Hardy and L Bontoux, September 1997, (EUR17711EN/F)R
- *"An Internet-based information system for Euro-Mediterranean S&T cooperation",* G Caratti, S Gomez y Paloma, proceeding of the Fourth Meeting of the Monitoring Committee for Euro-Mediterranean cooperation in RTD, at Enkhuizen (NL) 19-21 June 1997, Published by TNO (ISBN: 90-6743-514-7).
- *"Technological Know-how processes, Convergence and Growth in the European Less Favoured Regions,"* J Rojo de la Viesca, paper and poster presented at the International Conference on Technology Policy and Less Developed Research and Development Systems in Europe, United Nations University-Intech and IPTS, Seville, Spain, 17-18 October 1997 (ORA/PRO 41053).
- *"2nd meeting on Education, Scientific and Cultural Cooperation between the EU and GCC (Gulf Cooperation Council)",* S Gomez y Paloma (Key-speaker) Kuwait City, 21-22.10.1997.

For more information see:  
<http://www.jrc.es/reg-dev/TEC05.html>



# Natural Resource Management

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tel. +34.95.448.83.25  
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Water is an increasingly valuable and disputed resource and there is a clear need to offer support to decision-makers confronting the complex technological, economic, administrative and educational issues relating to its management. The IPTS has examined a range of S&T solutions in their socio-economic context to assess their potential contribution to providing Europe with sufficient water of adequate quality now and in the future. In 1997 IPTS work in this field focused on three areas:

- Cost/benefit analysis of selected water-related technologies.
- Assessment of the market and non-market value of water for a variety of uses.
- Policies for the sustainable management of water.

IPTS work on the cost/benefit assessment of selected water-related technologies has considered their availability, economic, environmental and social costs and benefits and their prospects for future development. The aim was to provide decision-makers with information about present and developing water technologies, and their relationship to policy objectives.

The IPTS project on the assessment of the value of water examined methodologies for considering, the direct and indirect, market and non-market-based components of its value in its different uses. The project identified methodologies which may be appropriate for use at regional level, with a view to other applications for regional government in the future.

## MAIN ACHIEVEMENTS IN 1997

- As part of the study on assessing the value of water a report was published entitled '*Assessing the Societal Value of Water in Its Uses*', A Burrill, February 1997 (EUR17297EN) and a pilot project was carried out in the Lower Guadalquivir Basin in collaboration with the University of Seville.
- The first meeting of experts for the sustainable management of the water resources project was organized in November 1997 to review the data on the various aspects of water management with regard to their quality, reliability and completeness.
- Also published: '*R&D policies: Case Study: Water. Present Status in Greece, Italy, Portugal and Spain* ', G Suzenet, October 1997 (EUR 17726EN)



The third water management project looked at the sustainable management of water resources, taking into consideration current policies and future orientations. This aimed to develop a set of programme evaluation and selection tools to support DG XVI (Regional Policy and Cohesion) in decision-making regarding the possible future orientation of Structural Funds.

The results of the third project have also served as a building block for the section on water in DGXVI's 'European Spatial Development Perspective'. The IPTS' role was to assess different parameters linked to the management of water quantity and quality and identify possible strategies for integrated water resources management in the Mediterranean Basin.

**For more information see:**

**[http://www.jrc.es/resource\\_management/TEC06.html](http://www.jrc.es/resource_management/TEC06.html)**



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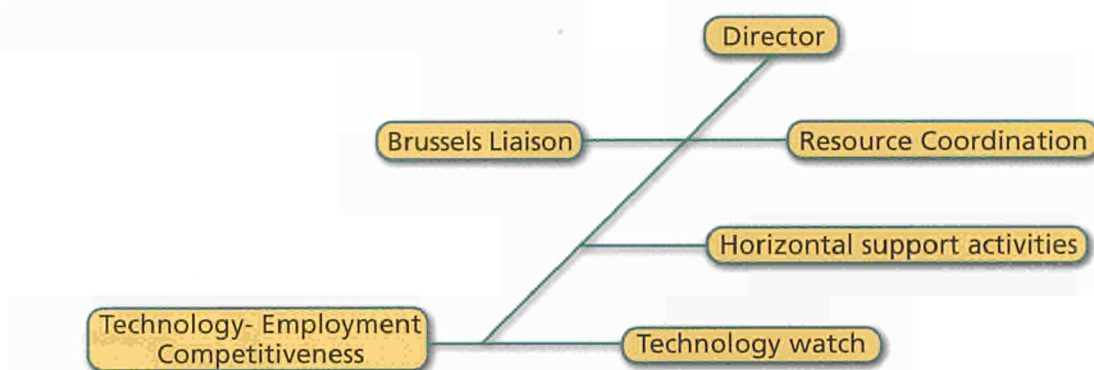
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## The Structure of the IPTS

The IPTS structure covers both scientific activities and the essential supporting functions including communication and liaison, administration and finance. The institute's scientific functions have been split into two broad areas, technology-employment-competitiveness and technology watch, although there is naturally a great deal of interaction between them at all levels.

### OVERALL STRUCTURE OF THE IPTS IN 1997

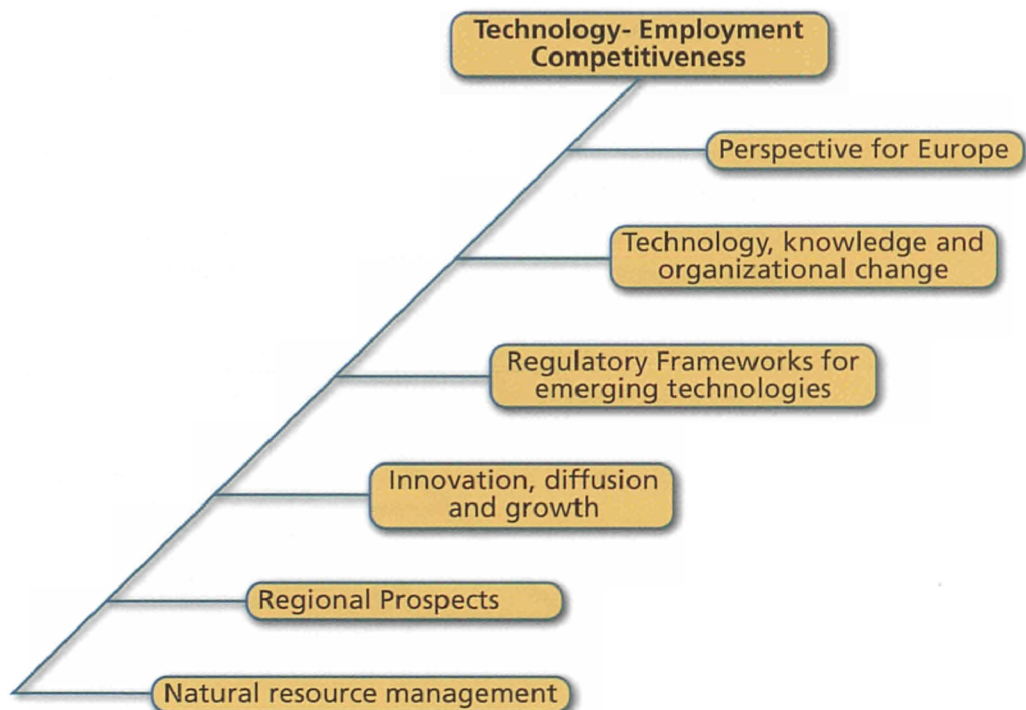


### The Scientific Units

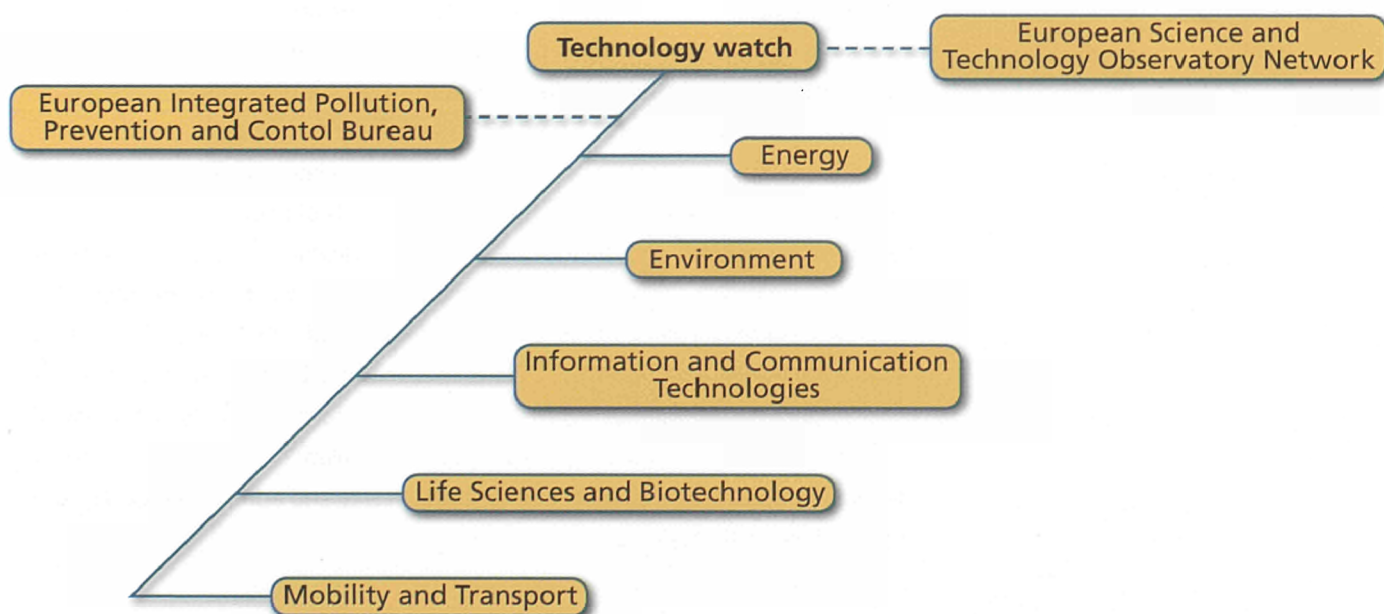
The S&T related activities of the Institute are carried out by two closely-related units: the Technology Watch (TW) Unit and the Technology-Employment-Competitiveness (TEC) Unit. The TW unit uses individual S&T areas (energy, intermediate technologies, environment, etc.) as its organizing principle and point of reference. The TEC activity finds its organizing principle and point of reference at the level of socio-economic principles, in particular in the interrelation between technology, employment and competitiveness. Beyond these points of reference and organizing principles both units share the three-level approach described above. In view of the frequent overlaps between fields there is obviously a great deal of interaction between the two units, both in terms of their fields of competence and in their sharing of human resources. This kind of flexibility has been a key feature of the IPTS' approach right from the start and continues to form part of its philosophy of multidisciplinary and avoiding rigid compartmentalization. As a result, 'cross-fertilization' between the units is an every-day reality and adds to the quality and scope of the Institute's output.



## THE TECHNOLOGY - EMPLOYMENT - COMPETITIVENESS UNIT



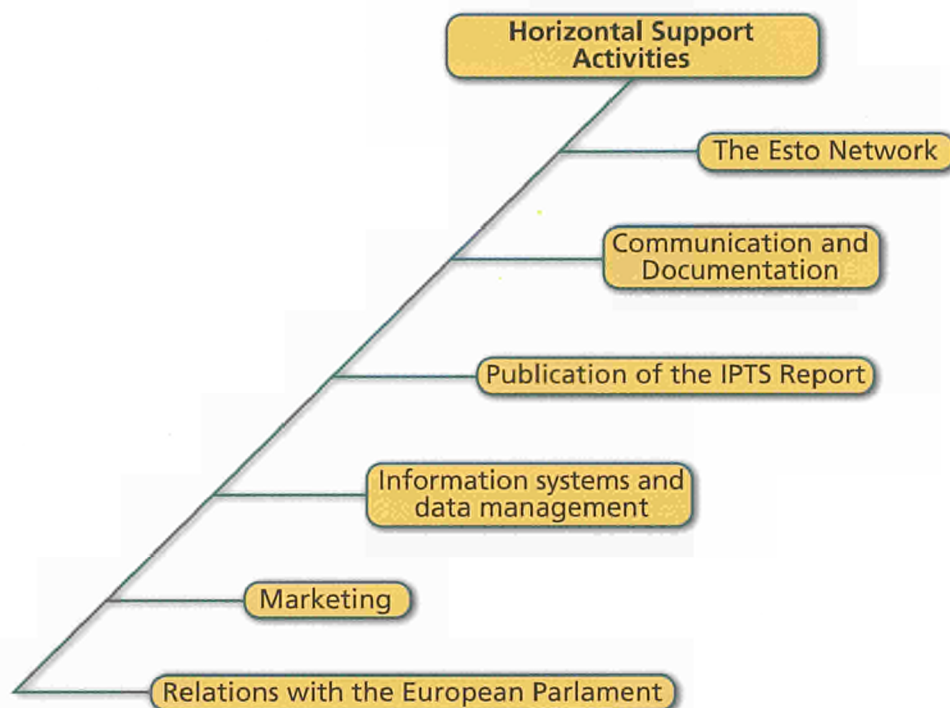
## THE TECHNOLOGY WATCH UNIT



Attached to the Technology Watch Unit, the European Integrated Pollution Prevention and Control Bureau (IPPC Bureau), has a very specific mission, which was defined for it in the Integrated Pollution Prevention and Control Directive.

### Support Activities

The horizontal support activities cover a set of tasks including information systems, documentation and marketing, together with more specific functions such as publication of The IPTS Report, liaison with other services of the European Commission and with the European Parliament, and managing contacts with the ESTO network.



### Administration

The administration department handles finance and personnel, staff issues, contracts and recruitment.





## IPTS Staff

The IPTS' human resources comprise staff on permanent posts and staff on fixed-term contracts, with a roughly even split between the two groups.

### Recruitment

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The recruitment procedure differs according to staff grade and function. Permanent (or statutory) staff are generally appointed to the Institute via the normal channels of entry to the European Commission services. However, fixed-term staff, which includes most people working in technical and research areas, are recruited directly by the IPTS.

This group is subdivided, according to experience and background, into the following classes:

- Auxiliary agents
- Grant-holders undertaking work on a PhD
- Post-doctoral grant-holders
- Visiting scientists (university teaching staff, high-level scientific staff, etc.)
- Seconded national experts



All these posts are temporary and range in duration from three months to three years, depending on category, preferences and other factors. Grant-holders must apply through the Training and Mobility of Researchers (TMR) programme, which is open to nationals of EU Member States or Associated States (currently Iceland, Liechtenstein, Norway and Israel) and are required to propose a specific project, which of course must be in line with the Institute's research areas, on which they will work while at the IPTS.

### Staff Breakdown

In the following tables, staff on interim contracts as well as statutory staff under short fixed term contracts (auxiliary agents) are included under the heading 'non-permanent' staff.

#### Staff on permanent posts by grade (Dec. 1997)

	A	B	C
Scientific	27		
Support		6	10

#### All staff

	Scientific	Support	Total
Staff on permanent posts	27	16	43
Non-permanent staff	24	19	43
Total	51	35	86

## The IPTS Budget

Contact person: Thierry Lacour

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Fax. +34 448 83 00

From the budgetary point of view IPTS activities are divided into two main areas: Institutional Activities and Competitive Activities, the difference being whether they are funded from the IPTS' own budget or from external project funding.

### Institutional Activities

The IPTS' had a budget of 10,470Kecus for Institutional Activities in 1997. This was directed at two areas:



- Institutional support: This accounts for approximately 60% of the IPTS' work and includes activities providing direct support to EU policy-makers in response to specific requests.
- Institutional research: This accounts for the remaining 40% of the IPTS' work and includes activities building and developing the Institute's core competences, and carrying out research aimed at anticipating future requests.

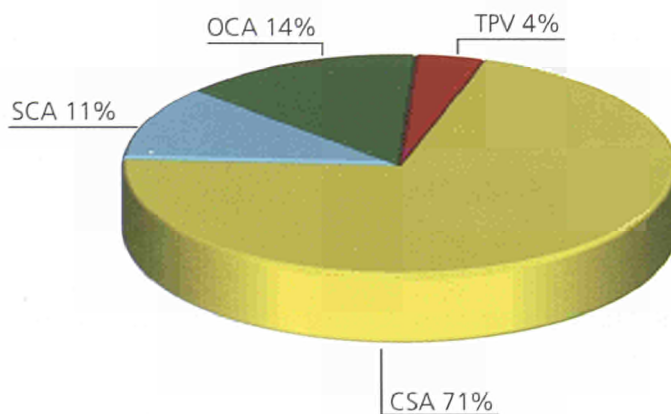
### Competitive Activities

Competitive Activities were of four different types:

- Shared Cost Actions & Accompanying Measures (SCA) in which the IPTS participates in collaborative research projects co-funded (usually 50%) by an EC research programme. Such measures have proved an effective way of networking the IPTS with other EU organizations and strengthening the European dimension of projects.
- Competitive S&T Support Activities (CSA), under which the IPTS responds to requests from European Commission Directorates General with the work being allocated on a competitive basis. The funds are provided from the EU RTD Framework Programme and cover up to 100% of the cost.
- Other Competitive Activities (OCA), in which the IPTS participates in calls for tender by European Commission services, outside the Framework Programme.
- Third Party Work (TPW), which includes activities undertaken through contracts with public or private bodies and for which 100% funding is provided by the user.

During 1997, considerable effort was made by the IPTS in the area of Competitive Activities, and contracts with a total value of 1,885Kecus were signed.

### Competitive Contracts Signed in 1997



**Publications**

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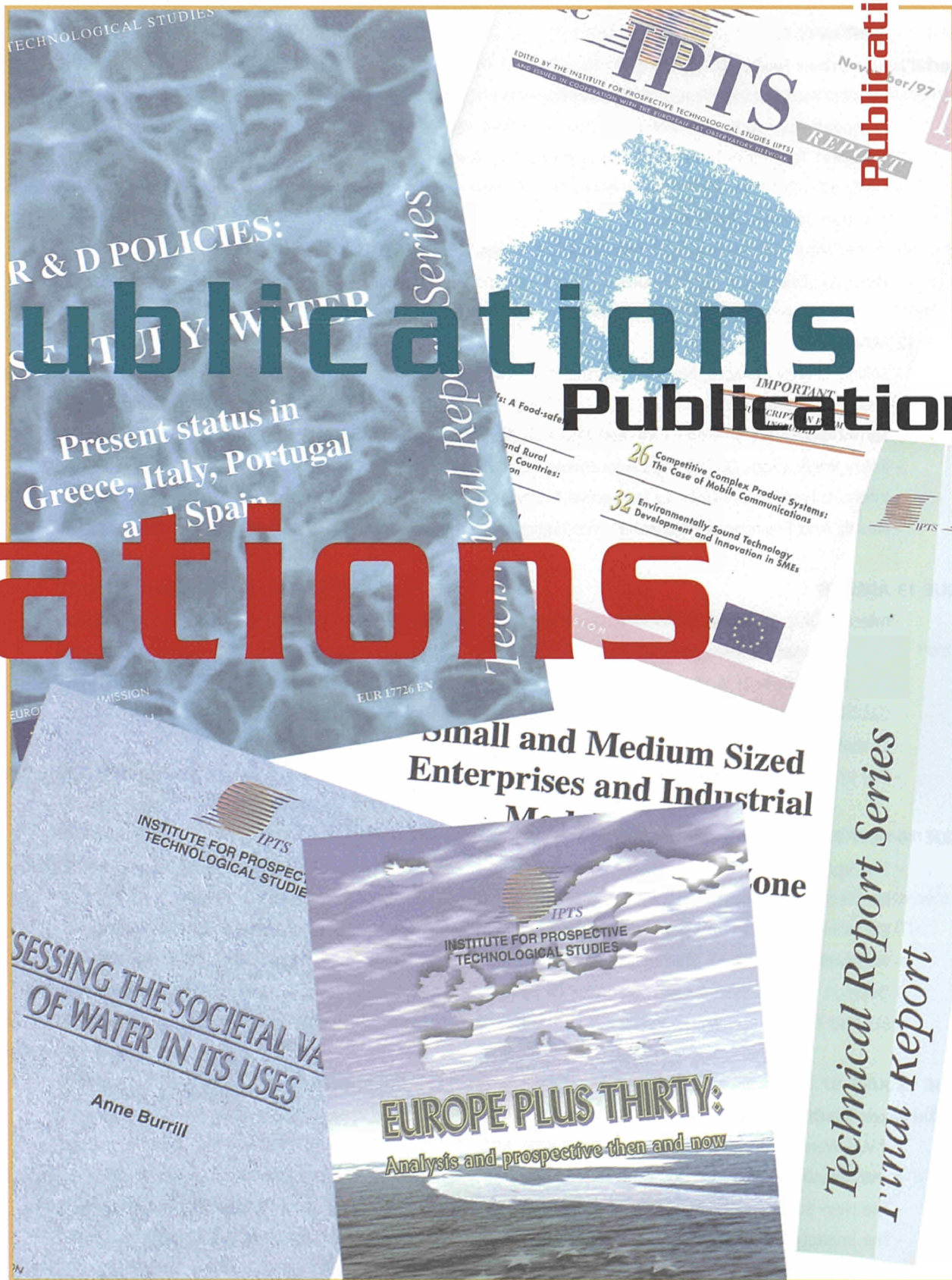


Publications

# Publications

Publications

# cations



Technical Report Series  
Annual Report

Public

# Articles Published in The IPTS Report

## ISSUE 11 FEBRUARY 97

### Special Issue: Urban Mobility

- Mobility And Communication In The Agglomerations Of Today And Tomorrow - Christian Neuhaus, Daimler-Benz AG
- European Approaches To Mobility In The City: New Vehicle Technologies - Contributed By EUCAR
- Transport Telematics To Improve Congested Urban Areas - Fabiana Scapolo, IPTS
- Finding An Exit From The Mobility Maze: Non-Conventional Approaches To Mobility In Urban Areas - John Whitelegg, Liverpool John Moores University
- A Transition To Sustainable Mobility - Celia Greaves, CEST (ESTO)
- Who Will Decide On Optimal Urban Freight Transport? - Roel ter Brugge, Wim Dunnewold, TNO (ESTO)

## ISSUE 12 MARCH 97

- Selling Energy Services, Not Just Electricity: Towards A Tertiarization Of EU Electricity Utilities - P. Moncada Paternó Castello, A. Soria, IPTS
- Technology Policy Strategy: Between Research And Development - D. Kyriakou, IPTS
- Policy Implications Of The Trips Agreement - G. Di Pietro, IPTS
- Internet: From Hyper-Links To Interactive-Multimedia - J. Perdígao, ISIS-JRC-Ispra
- Health And Environment Improvements Through Novel Food-Packaging Technologies - M. Demicheli, IPTS

## ISSUE 13 APRIL 97

- Internet: The Academic Network Revisited - Ioannis Maghiros, IPTS
- Smart Is Beautiful - Alois Frotschnig, IPTS
- Technology Deficits And Sustainable Development In Less Favoured Regions of the EU - James P. Gavigan, Cecilia Cabello, IPTS, Francois Farhi, Centrale Management International, Paris
- Global Climate Change: Potential Impact On Human Health - Astrid Zwick, IPTS
- The Importance Of Interdisciplinary Approaches: The Case Of Nanotechnology - Ineke Malsch, IPTS

## ISSUE 14 MAY 97

- The Significance Of Environmental Technology For Economically And Ecologically Sustainable Development - Reinhard Coenen, Sigrid Klein-Vielhauer, ITAS (ESTO)
- Electronic Access To Public Information: Government On-Line - Dr. Puay Tang, SPRU (ESTO)
- The Web Of Babel? - J. Stamm'ler Jaliff, IPTS, M.T. Carrasco Benítez, I. Urquhart, DGXIII-E
- Decision Support Systems In The Service Of Policy Makers - M. Paruccini, P. Haastrup, D. Bain, ISIS-JRC-ISPRA
- EU And The Mediterranean Region: A Future Dilemma? - Matteo Bonazzi, Sergio Gómez y Paloma, IPTS

## ISSUE 15 JUNE 97

### Special Issue: Made In Europe

- If We Were To Do It Over Again - R. M. Solow, MIT
- The New Dimensions Of Competitiveness: Towards A European Approach - B. Coriat, University of Paris XIII (CREI)
- The New Socio-Economics Of Organization, Competitiveness And Employment - G. Dosi, University of Rome
- The Impact Of Globalization On European Economic Integration - Prof. Luc Soete, MERIT
- Made For Living? Sustainable Welfare And Competitiveness - K. Ducatel, G. Fahrenkrog, J. Gavigan, IPTS



## ISSUE 16 JULY 97

- Biotechnology As A Cleaner Production Technology In Pulp And Paper - Chris Tils, Per Sørup, IPTS
- Towards Meeting CO<sub>2</sub> Emission Targets: The Role Of Carbon Dioxide Removal - C. A. Hendricks, IPTS, W.C. Turkenburg, Univ. of UTRECHT
- Knowledge-Intensive Innovation: The Potential Of The Cluster Approach - Dany Jacobs, TNO-STB (ESTO)
- Distance Learning: Opportunities And Problems - Maria Laura Bargellini, ENEA (ESTO)
- European Standardization And Product-Integrated Environmental Protection - Juliane Jürissen & Gotthard Bechmann, ITAS (ESTO)

## ISSUE 17 SEPTEMBER 97

### Special Issue: Health Policy

- Bridging the Gap between the Interests of Patients and the Pharmaceuticals Market - Silvio Garattini, Instituto di Ricerche Farmacologiche "Mario Negri"
- Early Warning System and Technologies to Prevent Food-borne Diseases: The US Experience - Robin Yeaton Woo, Kristin Digiulio, Lester Crawford, Georgetown University
- European Health Policy: Defining Priorities - Elias Mossialos, LSE
- Telemedicine: Fulfilling the Promise - Jeremy Holland, CEST (ESTO)
- Minimally Invasive Surgery: Benefiting Patients and Health-Care Systems - Marie-Laure Spaak, Patrick Urso, ADIT (ESTO)

## ISSUE 18 OCTOBER 97

- Municipal Wastewater: Public Health and the Environment - Laurent Bontoux, IPTS
- Technology and Competitiveness
- US-driven trends in combinatorial chemistry - Chris Tils, IPTS
- Collaboration in Research and Development in Food Safety in the EU - Erik Millstone, SPRU (ESTO)
- Joint implementation from a European Perspective - Chris Hendriks, Astrid Zwick, Antonio Soria, IPTS, Frank Peeters, VITO (ESTO)
- Facilitating Technology Uptake: The Case of Smart Structures and Materials - Celia Greaves, CEST (ESTO)

## ISSUE 19 NOVEMBER 97

- Nitrates in Foodstuffs: A Food-safety Issue - Miguel Vega, Laurent Bontoux, IPTS
- Photovoltaic Technology and Rural Electrification in Developing Countries: The Socio-economic Dimension - Juan Carlos Císcar, IPTS
- Network Enterprises and the Information Society: Issues for EU Regional Policies - Marco Lopriore, Unioncamere
- Competitive Complex Product Systems: The Case of Mobile Communications - Andrew Davies, SPRU (ESTO)
- Environmentally Sound Technology Development and Innovation in SMEs - Paulo Partidario, INETI (ESTO)

## ISSUE 20 DECEMBER 97

### Special Issue: Food

- Food applications of the New Polysaccharides Technology - Miguel Vega, Laurent Bontoux, IPTS
- "Novel Foods" Regulations: Letting EU Consumers know what's on the Menu - Marina Leonardi, ENEA, (ESTO), Marina Miraglia, Roberta Onori, Carlo Brera, Istituto Superiore di Sanita
- From alternative Agriculture to the Food Industry: The Need for Changes in Food Policy - Niels Heine Kristensen, Thorkild Nielsen, Technical University of Denmark (ESTO)
- Integrated Chain Management of Food Products - Dirk Ceuterick, VITO (ESTO)
- A Comparison between Functional Food Markets in the EU, US and Japan - Simon Proops, CEST (ESTO)
- ONutrition Policy as a means of Health Prevention - Annette Schmitt, VDI-TZ (ESTO)






















## List of other 1997 IPTS publications

Date	Author	EUR/WP	Title
Dec-97	Eamon Cahill, Ken Ducatel	EUR 17732	Advanced technology and the competitiveness of European Industry; the cases of textiles, steel, motor vehicles and aerospace
Dec-97	G. Di Pietro, S. Gomez y Paloma	EUR 17731	Small-and-Medium Enterprises and Industrial Models in the Euro-Mediterranean Zone
Dec-97	A. Zwick	EUR 17725	Climate Change Research and Policy Updates. no. 10, Part II
Nov-97	A. Zwick & W. Kennet	EUR 17724	The Indonesian Forest Fires - In Perspective
Nov-97	D. Kyriakou	S.P.I. 97 108	Europe Plus Thirty: Analysis and prospective then and now
Nov-97	L. Bontoux. F. Leone	EUR 17716 EN EUR 17716 FR	The legal definition of waste and its impact on waste management in Europe = La définition légale du déchet et son impact sur la gestion des déchets en Europe
Nov-97	G. Fahrenkrog	S.P.I 97 102	Made in Europe: employment through innovation & diversity. Report of the Launching Seminar (Seville, 6-7 October, 1997)
Oct-97	G. Suzenet	EUR 17726 EN	R&D Policies: Case Study: Water. Present Status in Greece, Italy, Portugal and Spain
Oct-97	I. Malsch	EUR 17710 EN	Nanotechnology in Europe: Experts' perceptions and scientific relations between subareas
Sep-97	P. Hardy. L. Bontoux	EUR 17711	Research Policy and Technological Development in the Southern and Eastern Mediterranean Countries = Politique de Recherche et Développement Technologique dans les Pays du Sud et de l'Est de la Méditerranée
Sep-97	M. Hunecke. D. Sibum	EUR 17712 EN	Socioeconomic Aspects of Individual Mobility
Sep-97	A. Zwick	EUR 17703 EN	Climate change Research and Policy: updates - No. 10
Jun-97	M. González (Editor)	EUR 17670 EN	1996 IPTS Annual Report
Jun-97	S. Isoard. A. Soria	WP97/05	Learning Curves and Returns to Scale Dynamics: Evidence from the emerging Renewable Energy Technologies
Jun-97	S. Isoard	WP97/04	Increasing Returns and the Diffusion of Innovations
May-97	D. Kyriakou & I. Maghiros	EUR 17751 EN	Multimedia Information Society



**ENER** - Energy  
**ENVI** - Environment  
**ITMT** - Industrial Technology Material & Transport  
**BIOT** - Biotechnology  
**IT** - Information Technology

**ISDM** - Information Systems & Data Management  
**COMP** - Competitiveness  
**E&T** - Employment & Technology  
**RA** - Residents' Association  
**VA** - Various





























ENER	ENVI	ITMT	BIOT	IT	ISDM	COMP	E&T	RA	VA
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									
									

Date	Author	EUR/WP	Title
May-97	A. Rip. R. te Velde	EUR 17341 EN	The Dynamics of Innovation in Bio-engineering Catalysis Cases and Analysis
May-97	H. Rothman	EUR 17342 EN	Identifying 'Hot Spots' In Engineered Biocatalyst Research And Applications By Means Of Bibliometrics
May-97	H. van Lente	EUR 17340 EN	Towards an Integrated conceptual Framework: Modern biotechnology and the Greening of Industry
May-97	M. Rogers	EUR 17667 EN	The Japanese Technological Response to Global Environmental Problems II
May-97	M. Rogers	EUR 17666 EN	Japanese science and Technology Policy
Apr-97	T. Gameson, G. di Pietro, K. Ducatel, F. Leone, P. Sørup	EUR 17350 EN	Environment and Employment
Apr-97	M. Aguado. J. C. Císcar	EUR 17668 EN	The Socio-Economic Impact of Renewable Energy Projects in Sourthern Mediterranean Countries : Methodology
Apr-97	M. Aguado (Editor)	EUR 17298 EN	Proceeding of Profutures Workshop: Scenario Building Convergences and differences
Mar-97	C. Tils	WP97/03	Modern Biotechnology and the Greening of Industry
Mar-97	G. Mezelas	EUR 17752 EN	A prospective analysis of European pharmaceutical research deveopment & innovation
Feb-97	P. Hardy	EUR 17304 EN	Science & Technology Policy in Sourthern Mediterranean Countries: The Cases of Egypt, Jordan, Tunisia and Turkey
Feb-97	A. Burrill	EUR 17297 EN	Assessing the Societal Value of Water in its Uses
Feb-97	J.P. Gavigan. E. Cahill	EUR 17301 EN	Overview of recent European and Non-European national technology foresight exercises
Jan-97	A. Zwick	EUR 17303 EN	Climate change Research and Policy: updates - No. 9 January 1997
Jan-97	SPRU. G. Caratti & B. Rhode (editors)	EUR 17344 EN	International co-operation in research and technological development :report from a symposium held in Brussels, 19 November 1996



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European Commission

**EUR 18062 - Institute for Prospective Technological Studies - Annual Report 1997**

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The Institute for Prospective Technological Studies supports the European Union (EU) policy making processes by "collecting", "interpreting" and "communicating" Science & Technology (S&T) developments (events, trends and impacts). Therefore, most of IPTS' work is undertaken in reply to specific requests for assistance by the European Union institutions, mainly the European Commission and the European Parliament services, as well as to third party organisations, in the framework of the competitive mandate given to the Joint Research Centre.

IPTS addresses various technological matters, where it is important to ensure a neutral and Europe-wide assessment of scientific and technological change, and to gain a better understanding of technology in the socio-economic environment. Prospective studies are carried out by IPTS in major research areas, exploiting synergies and crossbreeding between those areas.

















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